

NOT To be  
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## CLAIMS

### I CLAIM:

① A method for producing a cathode mixture having manganese oxide particles, comprising:

- providing a first chemical compound having manganese;
- providing an organic reducing agent having a single carbon atom;
- 5 mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles; and
- adding the sol to a carbon slurry to produce a carbon slurry with suspended manganese oxide particles.

2. The method as recited in claim ① wherein the first chemical compound comprises potassium permanganate.

3. The method as recited in claim ① wherein the reducing agent comprises sodium formate.

4. The method as recited in claim ① wherein the reducing agent is selected from the group consisting of formic acid and formaldehyde.

5. The method as recited in claim ① wherein the mixing step is carried out approximately at a neutral pH level.

6. The method as recited in claim ① wherein the sol contains manganese dioxide particles.

7. The method as recited in claim ① wherein the carbon slurry comprises a mixture of activated carbon and carbon black.

8. The method as recited in claim ① wherein the activated carbon and carbon black have a BET surface area of approximately 900 m<sup>2</sup>/g and 1500 m<sup>2</sup>/g, respectively.

9. The method as recited in claim ① wherein a plurality of the manganese oxide particles have a size between 20 to 26 micrometers.

⑩ A method for producing a cathode having manganese oxide particles, comprising:

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- providing a first chemical compound having manganese;  
providing an organic reducing agent having a single carbon atom;  
5 mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles;  
adding the sol to a carbon slurry to produce a suspension of carbon slurry containing manganese oxide particles;  
mixing a waterproofing agent to the suspension to produce a cathode compound;  
10 and  
drying and rolling the cathode compound.

11. The method as recited in claim (10) wherein the waterproofing agent is selected from the group consisting of Teflon T-30 and polyethylene. (poly tetra fluoro ethylene)

12. The method as recited in claim (10) further comprising laminating the cathode compound with a screen on one side and an air diffusion layer on a second side opposite the first side.

13. The method as recited in claim (12) further comprising attaching a separator to the screen.

14. The method as recited in claim (10) further comprising installing the cathode in a metal-air cell.

15. The method as recited in claim (14) wherein the metal-air cell is a zinc-air cell.

16. The method as recited in claim (14) wherein the metal air-cell is a button cell.

(17) A method for producing a cathode mixture having manganese oxide particles, comprising:

- providing a first chemical compound having manganese;  
providing an organic reducing agent;  
5 mixing the first chemical compound with the reducing agent to yield a sol of manganese oxide particles; and

particles

adding the manganese oxide compound to a carbon slurry to produce a suspension of carbon slurry with suspended manganese oxide particles.

18. The method as recited in claim (17) wherein the reducing agent is organic having a single carbon atom.

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